FAA AVIATION NEWS

JULY 1970

COVER

Three little ingredients are all it takes to transform a soft white cloud into a raging storm. See page 8.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / **FEDERAL AVIATION ADMINISTRATION** VOL. 9, NO. 3

CONTENTS/July 1970

3 Breathing from a Bottle

4 Take it Around—with Care

6 Current Status of FARs

7 Blind Spots VII: How Far Can You See

8 Up the Down Stormdrafts

10 Pilgrim's Progress

12 Famous Flyers: Ham & Eggs Lawson

13 Pilot Briefs

14 News Log: RNAV Approaches at Six Airports . . .
Atlanta is 1st Terminal Control Airport . . .
Weather Radar Hazards Told . . . Mr. Two-million . . .
Flyer Flicker Fare . . .

15 Flight Forum

Circling the tower. Page 4

Built-in security. Page 10

John A. Volpe, *Secretary of Transportation*

John H. Shaffer, *Administrator, FAA*

Dennis Feldman, *Acting Asst. Administrator for Public Affairs*

Lewis D. Gelfan, *Chief, Publications Division*

FAA AVIATION NEWS is published by the Office of Public Affairs, PA-20, Federal Aviation Administration, Washington, D. C. 20590, in the interest of aviation safety and to acquaint readers with the policies and programs of the agency. The use of funds for printing FAA AVIATION NEWS was approved by the Director of the Bureau of the Budget, July 14, 1967. Send change of address to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, with a mailing label from any recent issue. Single copies of FAA AVIATION NEWS may be purchased from the Superintendent of Documents for 20 cents each. All printed materials contained herein are advisory or informational in nature and should not be construed as having any regulatory effect. The FAA does not officially endorse any goods, services, materials, or products of manufacturers.

SUBSCRIBERS: **Mail Coupon to** → Superintendent of Documents, Government Printing Office. Washington, D.C. 20402

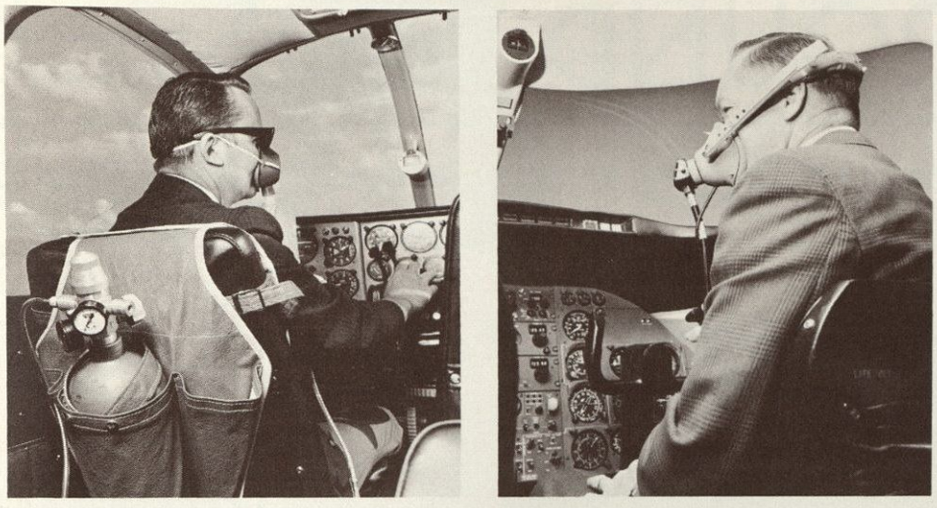
Please enter my subscription to FAA AVIATION NEWS for one year at $2.00 ☐, two years at $4.00 ☐, or three years at $6.00 ☐, 50 cents a year additional for foreign mailing. Enclosed find $..... (Check or money order)

Name .....

Address .....

.....

City, State and ZIP code.....



Left—WRONG. Wearing the strap over the ears may pull the oxygen face mask up over the nose, permitting leakage around the mouth area. **Right**—RIGHT. Mask should press evenly against the face.

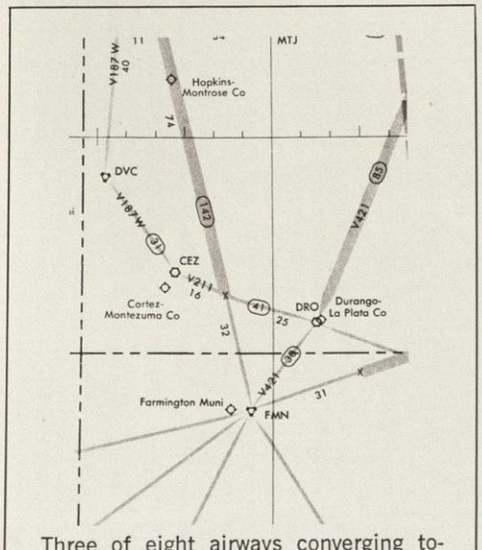
breathing from a bottle

New charts, pamphlets explain the use of supplemental oxygen in general aviation aircraft

Assistance to pilots unfamiliar with the use of supplemental oxygen, as required by the new Part 91.32 ruling effective June 17, is available in the form of explanatory FAA literature. Further help is provided in current IFR Planning Charts, which show printed airways three times their normal width when the minimum enroute altitude of the airway is 14,000 feet or higher. This is to call the pilots' attention to the need for oxygen when flying unpressurized aircraft on these airways.

The new regulation requires the use of supplemental oxygen for general aviation aircrews operating unpressurized aircraft at altitudes between 12,500 and 14,000 feet mean sea level, except for a short period (no more than 30 minutes). Above 14,000 MSL the use of supplemental oxygen is required at all times for the crew, and above 15,000 feet each occupant of the airplane must be provided with an oxygen supply. Pressurized aircraft flying above 25,000 feet MSL must have at least a 10-minute reserve supply of oxygen for every person on board the plane.

The widened depictions of airways over 14,000 feet serve as a quick reference for pilots in flight planning over mountainous terrain, indicating where it is legal to fly with oxygen and where it is not. The new charts will also help pilots alter course safely in flight, in the event of oxygen system failure or oxygen supply shortage.



Three of eight airways converging toward Farmington fix over central Rockies indicate need for oxygen.

FAA's Office of Aviation Medicine has available several pamphlets of interest to pilots new to the use of oxygen at altitude. "Oxygen in General Aviation," pamphlet AM 66-28, is an overall summary of the use of supplemental oxygen by general aviation pilots flying unpressurized aircraft at the higher altitudes.

"Oxygen and the Potent Pint" explains the relative oxygen content at altitude. "Breathing in Flight" defines hypoxia and hyperventilation, two conditions which could be hazardous during high altitude flight without supplemental oxygen. "Oxygen Equipment" discusses various types of supplemental oxygen equipment. "Oxygen in General Aviation, FAA Report AM 66-28, is available from the Office of the Federal Air Surgeon.

Continuous flow oxygen systems are the most commonly used systems in general aviation aircraft. Oxygen flows constantly from the supply tank into a face mask reservoir. The flow rate is generally controlled automatically by a regulator. In other systems the flow is controlled by manually setting a flow controller to correspond with the appropriate altitude.

Acceptable flow rates which will protect the pilot and other occupants at various altitudes with suitable oxygen masks are:

12,500 feet	—0.8 liters per minute
15,000 feet	—1.1 liters/min.
20,000 feet	—1.7 liters/min.
25,000 feet	—2.3 liters/min.
30,000 feet	—2.9 liters/min.
35,000 feet	—3.5 liters/min.

A good snug mask fit is essential for safe flight at all altitudes; the mask should be checked out in advance.

Oxygen Supply Source

The oxygen supply may be derived from a portable bottle which slips into a bracket on the side of the seat, or from a multiple outlet fixture mounted permanently in the aircraft cabin. It is essential to take into consideration the oxygen duration time, and to check this against the flight plan.

Diluter demand oxygen systems may be used in lieu of continuous flow systems. Diluter demand systems generally use the oxygen supply at a slower rate than continuous flow systems because the oxygen flow varies according to the breathing rate of the user. These systems are more complex and more expensive than continuous flow systems.

Pilots planning a prolonged flight (4 or 5 hours) at 10,000 to 12,500 feet should consider the use of supplemental oxygen, even though the rule does not require it. Prolonged flight at 10,000 feet to 12,500 feet may result in headache and listlessness, depending upon state of health, stress, fatigue, smoking habits, etc.

Copies of "Oxygen in General Aviation," "Oxygen and the Potent Pint," "Breathing in Flight," and Oxygen Equipment" may be ordered from FAA's Civil Aeromedical Institute (CAMI) (AC-140), Aeronautical Center, Oklahoma City, Okla. 73125. Also useful are Advisory Circular 91-8, "Use of Oxygen by General Aviation Pilots/Passengers," available from the DOT/FAA Distribution Unit, TAD 484.3, 800 Independence Ave., S.W., Washington, D.C. 20590. ■

TAKE IT AROUND with care

An abbreviated go-around could put you on a collision course with aircraft entering the pattern on downwind.

Low wing aircraft turning onto a course from opposite directions could be hidden from each other's view by the upraised wing. EXPECT other traffic in the pattern.

The sun had set a few minutes earlier, there was haze in the air, and there were at least half a dozen aircraft in the airport traffic area: the stage was set for a shocking midair collision that would cost eight lives.

The tragic series of events began with what appeared to be a routine go-around. The Piper Aztec which had departed Providence Airport at 7:45 p.m., was attempting to land on Runway 33 when the controller in the privately operated control tower concluded that there would not be adequate clearance with a Bonanza rolling out on the active runway—he decided to "take it around."

The Aztec continued over the runway, gaining altitude, and executed a crosswind turn to the right (right hand pattern in effect). As the light twin was about to turn downwind, the controller, who had been observing him closely but without radio response, was called up by a Cherokee reporting on base leg and asking for landing clearance. The controller gave wind information and clearance to land. Seconds later he heard an excited voice on a garbled transmission, and as he looked in the vicinity of the downwind leg he observed falling debris—the aftermath of a midair collision.

The observations of airborne and ground witnesses varied. A pilot who was flying in a Colt stated that just before entering the downwind leg of the pattern he observed an aircraft coming from the northwest in the pattern and a second aircraft heading due west. The second aircraft turned on the downwind leg at the same position as the other aircraft and at a slightly lower altitude, gained altitude in the turn and rolled out so that both aircraft were on a parallel course. The two aircraft held this course for about three seconds, the witness estimated before colliding.

Another witness who was airborne at an altitude of 4,800 feet and whose position was estimated as eight to ten miles northeast of the collision, reported that he saw a small plane on a westerly heading. Moments later, he observed a larger plane closing on the small one at approximately the same altitude; the convergence angle was 70 to 80 degrees.

A ground witness on the airport, who

SEEN AND UNSEEN

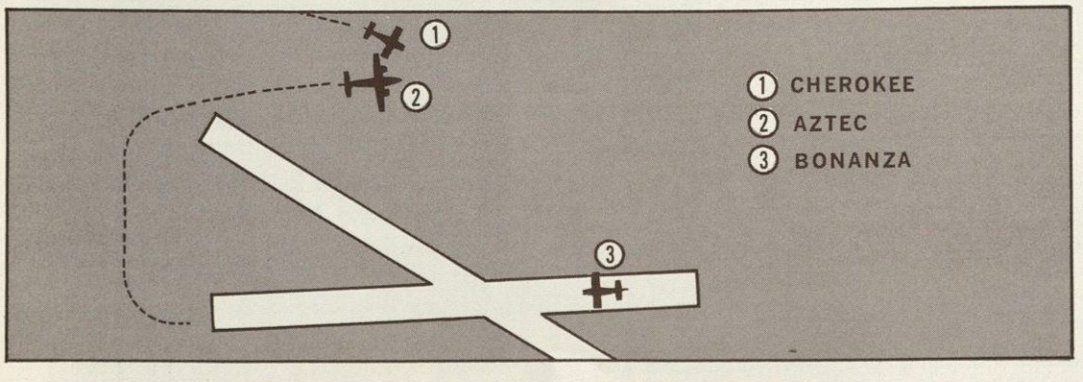
saw the Aztec make its aborted landing, observed it to make what appeared to be a normal but slightly wide downwind leg, at what looked to be normal pattern altitude. At about this time the witness saw a converging aircraft, which he later identified as a Cherokee, making a banking turn onto the downwind leg at approximately the mid point position. He described the weather as clear.

Another airborne witness, a qualified flight instructor, was near the checkpoint for entry to the downwind leg of Runway 33. His attention was attracted to a twin engine aircraft heading south with strobe lights showing. He estimated that the twin was at pattern altitude, moving fast and closing in on a small aircraft, which was heading either south or southwest, at the same level. He saw a ball of fire when the two aircraft hit and observed the twin engine aircraft spinning down with part of the left wing missing.

There were other witnesses, but none who actually survived the collision. Both pilots and three passengers in each aircraft perished. The National Transportation Safety Board's finding of probable cause was: both pilots failed to see and avoid other aircraft.

The pilot of the Cherokee was a youth of 23 with only 57 hours total time; the Piper Aztec pilot, 46, had 509 hours of flight time. None of these statistics were necessarily pertinent to the accident. Every pilot, regardles of age or experience, must never allow his preoccupation with landing an airplane to derogate his responsibility for using his eyes to clear the airspace around him. ■

Two low wing aircraft, the Aztec (above) and the Cherokee, entered the downwind leg of the landing pattern at about the same time, after the twin aborted a landing attempt because of traffic on the runway. Apparently neither pilot saw the other aircraft.



Left—aircraft No. 1 entered the pattern as aircraft No. 2 entered the downwind leg of a go-around. Prior landing attempt of No. 2 was aborted because of presence of aircraft No. 3 on runway.

FARs

STATUS of the FEDERAL AVIATION REGULATIONS

June 26, 1970

With the recent addition of Volumes III and VIII, FAA's program to collect its Federal Aviation Regulation Parts into 11 volumes of interrelated Parts is nearing completion on schedule.

The FAR volumes and the Parts still not collected into volumes are available at the prices indicated from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Order from: Superintendent of Documents, U.S. Government Printing Office, Wash., D.C. 20402

FAR PART/VOLUME	TITLE	PRICE
Vol. I, Part 1:	Definitions and Abbreviations	$1.50 + 50¢ foreign mailing
Vol. II: (Transmittals 1-3)		$8.00 + $2.00 foreign mailing
Part 11	General Rule-making Procedures	
Part 13	Enforcement Procedures	
Part 15	Nondiscrimination in Federally Assisted Programs of the FAA	
Part 21	Certification Procedures for Products and Parts	
Part 37	Technical Standard Order Authorizations	
Part 39	Airworthiness Directives	
Part 45	Identification and Registration Marking	
Part 47	Aircraft Registration	
Part 49	Recording of Aircraft Titles and Security Documents	
Part 183	Representatives of the Administrator	
Part 185	Testimony by Employees and Production of records in Legal Proceedings and Service of Legal Process and Pleadings	
Part 187	Fees	
Part 189	Use of Federal Aviation Administration Communications System	
Vol. III		$5.50 + $1.50 foreign mailing
Part 23	Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes	
Part 25	Airworthiness Standards: Transport Category Airplanes	
Part 36	Noise Standards: Aircraft Type Certification (This is a new FAR)	
Vol. V: (Transmittal 1)		$3.00 + 75¢ foreign mailing
Part 43	Maintenance, Preventive Maintenance, Rebuilding and Alteration	
Part 145	Repair Stations	
Part 149	Parachute Lofts	
Vol. VI: (Transmittals 1-2)		$5.50 + $1.25 foreign mailing
Part 91	General Operating and Flight Rules	
Part 93	Special Air Traffic Rules and Airport Traffic Patterns	
Part 99	Security Control of Air Traffic	
Part 101	Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons	
Part 103	Transportation of Dangerous Articles and Magnetized Materials	
Part 105	Parachute Jumping	
Vol. VIII		$3.50 + $1.00 foreign mailing
Part 133	Rotorcraft External Load Operations	
Part 135	Air Taxi Operators and Commercial Operators of Small Aircraft	
Part 137	Agricultural Aircraft Operations	
Vol. X: (Transmittals 1-2)		$4.50 + $1.25 foreign mailing
Part 151	Federal Aid to Airports	
Part 153	Acquisition of U. S. Land for Public Airports	
Part 155	Release of Airport Property from Surplus Property Restrictions	
Part 159	National Capital Airports	
Part 165	Wake Island Code	
Part 167	Annette Island, Alaska, Airport	
*Part 71	Designation of Federal Airways, Controlled Airspace and Reporting Points	
*Part 73	Special Use Airspace	
*Part 75	Establishment of Jet Routes	
Part 77	Objects Affecting Navigable Airspace	
**Part 95	IFR Altitudes	
**Part 97	Standard Instrument Approach Procedures	
Part 157	Notice of Construction, Alteration, Activation and Deactivation of Airports	
Part 169	Expenditure of Federal Funds for Nonmilitary Airports or Air Navigation Facilities Thereon (New FAR)	
Part 171	Non-Federal Navigation Facilities	

FAR PART	TITLE	PRICE	CHANGES
The FAR Parts listed below have not yet been assembled into volumes:			
Part 27	Airworthiness Standards: Normal Category Rotorcraft	.70	3
Part 29	Airworthiness Standards: Transport Category Rotorcraft	2.00	4
Part 31	Airworthiness Standards: Manned Free Balloons	.20	2
Part 33	Airworthiness Standards: Aircraft Engines	.40	3
Part 35	Airworthiness Standards: Propellers	.30	2
Part 61	Certification: Pilots and Flight Instructors	1.25	34
Part 63	Certification: Flight Crewmembers Other Than Pilots	.55	12
Part 65	Certification: Airmen Other Than Flight Crewmembers	.45	14
Part 67	Medical Standards and Certification	.25	7
Part 121	Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft	2.00	38
Part 123	Certification and Operations: Air Travel Clubs Using Large Airplanes	.25	2
Part 127	Certification and Operations of Scheduled Air Carriers with Helicopters	.35	14
Part 129	Operations of Foreign Air Carriers	.20	4
Part 141	Pilot Schools	.45	8
Part 143	Ground Instructors	.25	3
Part 147	Mechanic Schools	.20	2

* Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

** Due to the complexity, length, and frequency of issuance, airworthiness directives, enroute IFR altitudes and instrument approach procedures are published in the Federal Register and are not included in basic Parts 39 and 95. In addition, enroute IFR altitudes and instrument approach procedures are depicted on aeronautical charts.

Instrument approach procedures are published in the Federal Register by reference to FAA documents which are available for examination at the Rules Docket (GC-24) and the National Flight Data Center, in FAA Headquarters, Washington, D.C. and at FAA Regional offices and Flight Inspection District Offices.

BLIND SPOTS VII

HOW FAR CAN YOU SEE?

It is of little value to a VFR pilot to know the visibility minimums which keep him legal if he has no means of estimating visibility in flight. The visibility reported to him by his FSS may not apply at all to the weather situation he encounters in a particular location en route. Is there anything he can do, other than guess blindly?

There is a simple trigonometric calculation which in most circumstances will give the VFR pilot a close approximation of his forward visibility. He can climb to a point where the ground is just barely visible over the nose of his airplane (obviously if this requires exceeding his ceiling he has no visibility problem). Each thousand feet of altitude above the ground will then roughly represent the number (or fraction) of *miles* of forward visibility he has.

The exact figure would vary, depending on the angle formed by the pilot's line of vision over the nose (cockpit cut off angle). This can easily be calculated while the aircraft is on the ground, and a suitable reference table established as follows:

(1) Adjust the aircraft attitude as close as possible to the normal cruise pitch attitude.

(2) Get in the pilot's seat and adjust it to the same position you would use in flight. Use your normal posture.

(3) Measure the distance from the ground to your eye level.

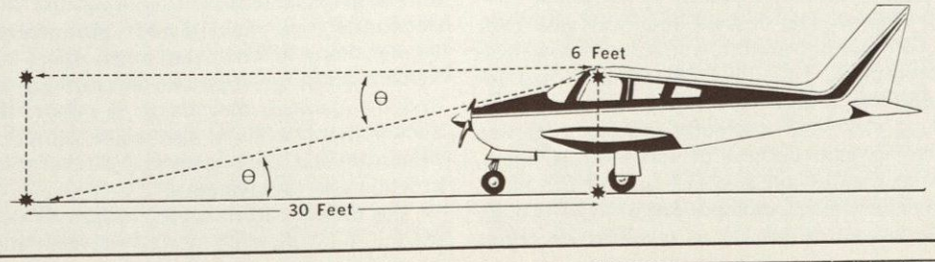
(4) Look over the nose of the aircraft to the point where the ground is just visible. Measure this distance from directly under your eye position along the surface.

(5) EXAMPLE: Eye height is 6 feet and ground distance is 30 feet. $\frac{6}{30} = .20$ (.20 is the tangent value.)

(6) Look for the tangent value closest to yours in the table below, and you will find the corresponding angle, which will be the cockpit cutoff angle for your aircraft. In this case, the closest value is .194, the angle is 11°, the visibility at 1,000 feet AGL is 5,150 feet. ■

Data provided by Bill Sullins, FAA, Southwest Region

TANGENT VALUE	ANGLE	APPROX. VISIBILITY AT 1000′ AGL	TANGENT VALUE	ANGLE	APPROX. VISIBILITY AT 1000′ AGL
.052	3°	19,200 feet	.213	12°	4,710 ″
.070	4°	14,280 ″	.231	13°	4,320 ″
.087	5°	11,500 ″	.249	14°	4,010 ″
.105	6°	9,530 ″	.268	15°	3,730 ″
.123	7°	8,130 ″	.287	16°	3,480 ″
.141	8°	7,090 ″	.306	17°	3,270 ″
.158	9°	6,330 ″	.325	18°	3,070 ″
.176	10°	5,750 ″	.344	19°	2,910 ″
.194	11°	5,150 ″	.364	20°	2,750 ″



Up the STORM

It had been a humid week in Virginia, and now on Saturday afternoon the young government worker enjoyed the breeze sweeping across Manassas Field as he walked toward his light plane. When he had called the Washington flight service station from his home he had been advised that the terminal forecast was good, although there were widely scattered thunderstorms along his route to Harrisburg, Pa.

He was not concerned. For the past two days he had observed thick fluffy cumulus clouds hanging almost motionless in the western sky toward the Appalachian range that paralleled his route north, but no rain had fallen, and the clouds looked no more dangerous than huge cream puffs. He still had an hour and a half of daylight to make the estimated 55-minute flight.

Thirty-five minutes out of Manassas he passed east of Gettysburg at 5,500 feet and as daylight faded he tuned in the Harrisburg VOR. The cumulus clouds had stayed widely spaced in a line to his left but up ahead he saw a thick layer of stratus clouds at his altitude so he descended to 3,500 feet, 500 feet below the floor of the stratus. Now the overcast added to the rapidly growing darkness.

Unnoticed, his ground speed picked up as a tailwind developed behind him. The early evening lights of Harrisburg came into view.

Suddenly the airplane began to climb and turbulence began to shake the plane with sharp jarring blows. Forward wheel pressure failed to halt the climb, indicated as over 800 feet per minute, so he eased the throttle back. He was now enveloped by the clouds; rain washed across his windshield and lightning flooded his cockpit, leaving him half blinded. The airplane continued to rise, even more rapidly. Panic became his copilot as the upward motion abruptly ceased, replaced by a violent rush downward. His descent rate was well over 1,000 feet per minute, and he was powerless to check it. Then, as suddenly as it had begun, the ordeal was over; the plane was flung clear of the clouds and the pilot was able to gain control of the aircraft again. A moderate rain was falling, but the lights of Harrisburg loomed large dead ahead. He landed as quickly as possible, his palms still sweating from the experience, his mind still puzzled as to what had happened. He was aware that luck alone had enabled him to survive.

What had happened was that one of those innocent-appearing cumulus clouds obscured by the overcast, had matured rapidly into a thunderstorm, sucking the light plane into its maelstrom.

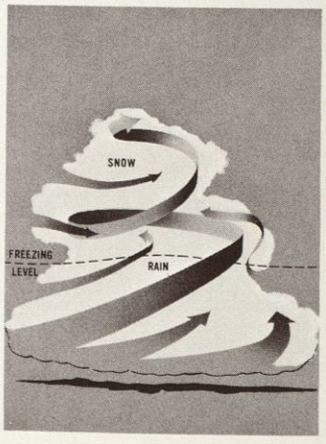
Two of the three ingredients of a thunderstorm had been present all week long along his flight path—*warm, unstable air, and high moisture content.* The third ingredient, *lifting action,* was provided by the upward slope of the terrain as he approached Harrisburg. (Other sources of lifting action are rising local temperatures, wind action, or turbulence.) The lift had extended the "cream puff" clouds to a higher altitude where its moisture was condensed into large droplets. The vicious updraft was the signal of a maturing thunderstorm.

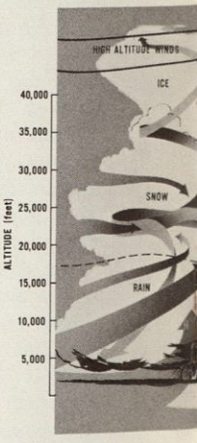
Going Down?

The interior of the thunderstorm becomes a churning mass of up and down drafts as moisture turns to rain drops and a heat exchange takes place. Updraft speed increases with altitude, and may reach a rate of 3,000 feet or more a minute. Downdrafts originate in the middle level of the cloud, and their speed diminishes as they approach the earth, but even so, they may reach 2,500 feet a minute. When the downdrafts approach the surface they spread out horizontally, producing strong and gusty winds that can extend 15 to 20 miles.

In addition to violent winds and rain, thunderstorms may also contain super cooled vapor which can produce dangerous icing in a matter of minutes, as well as snow and hail which can shatter windshields, deform the leading edges of flight surfaces and damage antennas. Lightning and thunderstorms are interrelated phenomena—where there is one, the other exists also. While lightning strikes on aircraft are rare and the damage they cause is minor, their sudden burst of light can cause temporary blindness and their electrical discharge can create radio interference.

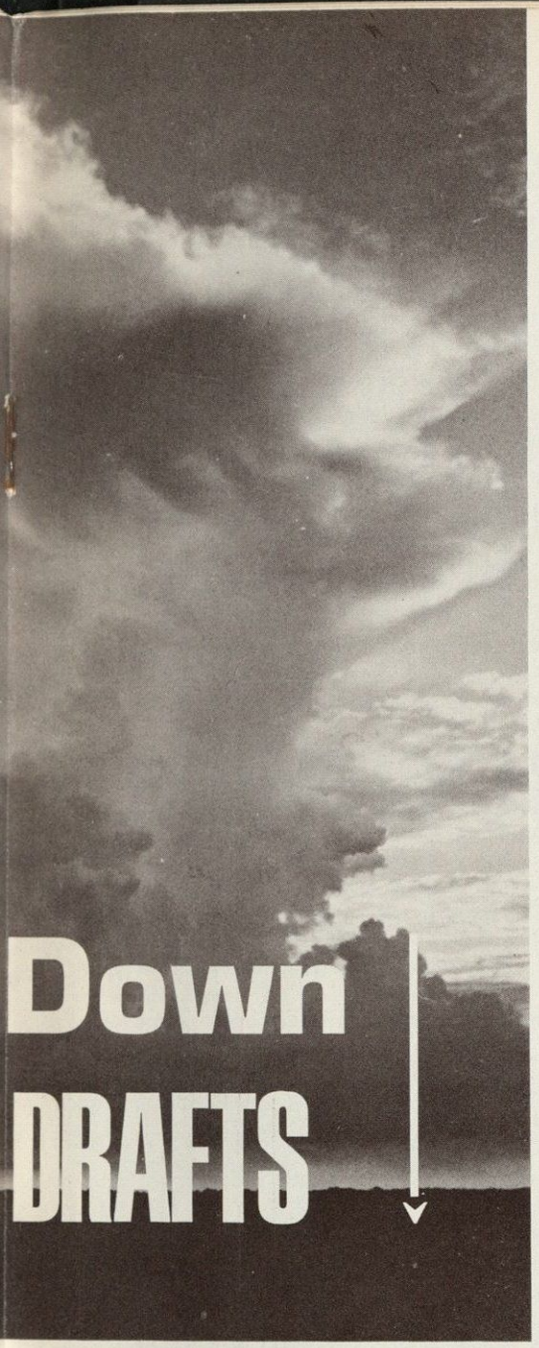
The thunderstorm season makes its debut in the 48 adjoining states in late spring



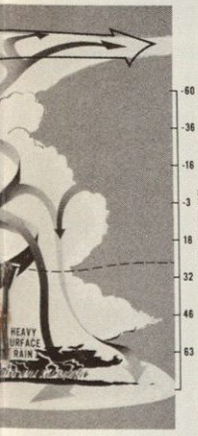


Updraft lofts warm moist air past condensation level where cumulus clouds form. Air entering at sides increases height of the cloud.

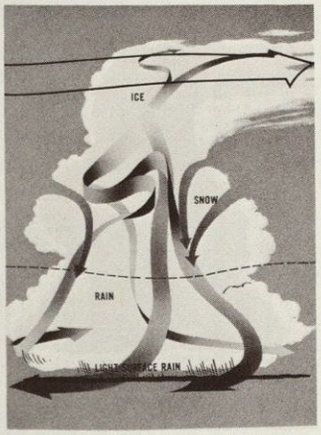
Downdrafts when storm particles for solid or liqui falls out bel



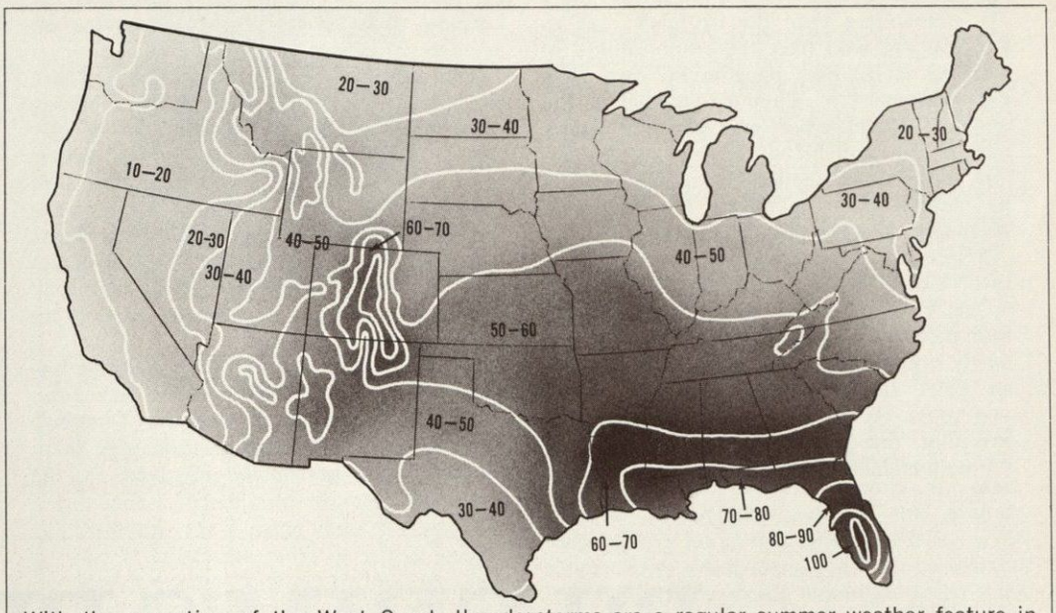
Down DRAFTS



join updrafts
matures. Ice
n at top while
d precipitation
ow.



In the final stages of a thunderstorm downdrafts prevail, causing surface winds to whip out in all directions, causing severe turbulence.



With the exception of the West Coast, thunderstorms are a regular summer weather feature in most of the U. S. Heaviest concentration is in the Florida penisula, followed by the southern portions of the southern states. The map gives a pictorial view of average annual "storm days."

when the temperatures begin to rise, and continues through the early autumn. Coincidentally, these are the months when most general aviation pilots do the bulk of their flying. The days are longer and summer is traditionally vacation time. Thunderstorms can occur in the morning hours after dawn and before noon, but most take place in the afternoon and evening—when vacationing pilots are most likely to be aloft.

Night Thunderstorms

Night thunderstorms are a regular part of the summer weather in northeast Oklahoma, east Kansas, east Nebraska, west Missouri and west Iowa, and to a lesser degree in east South Dakota and southern Minnesota. Why this is so is not clearly understood, but weather experts say the likely cause may be a combination of unusually high moisture content in clouds and radiational cooling aloft, strong low-level winds with warming at lower cloud levels and cooler tops.

The typical thunderstorm is about six miles across, extending upward six miles; but clusters of storms may stretch out over 100 miles in any direction. The individual life span normally ranges from 20 minutes to 1½ hours. In any given area, new storms may explode into life as others die, like a string of firecrackers. Thunderstorms move across the terrain at speeds slightly less than the prevailing wind, a fact pilots should take into consideration when storms are reported in the vicinity of their planned flight path.

The potent combination of unstable air, high moisture content, and lifting action occurs most often in the United States in Florida, especially in the center of the peninsula, around Tampa, which has about 100 thunderstorm days a year (days in which one or more thunderstorms take place). A geographical "strip" running from Louisiana to the Georgia coast has between 60 and 70 thunderstorm days a year. A large central area ranging from the Colorado Rockies to the South Carolina coast has between 50 and 60 thunderstorm days a year. Storm activity drops off by ten days a year in the strip directly to the north, running from Salt Lake City to the Carolina coast, and there is a fairly steady diminution as you continue to move north.

In the Southwest and West, the number of annual thunderstorm days gradually falls off as you move from the Rockies westward, with the Pacific Coast areas west of the Sierra Nevadas exhibiting the least amount of storm activity.

Regardless of how well a pilot knows his own region and its weather vagaries, a thorough briefing before all flights is a basic safety precaution. Reports of fronts and line squalls, even 50 miles distant, must be analyzed carefully.

Storms encountered aloft should be avoided by flying around them, if practical, or by landing at the nearest available airport.

Strong winds lurk unseen underneath storms, and clouds commonly tower far above the service ceiling of general aviation aircraft. Unless there is a 20-mile space between them, flight between storm clouds is very hazardous. Attempting to penetrate a thunderstorm in hopes of passing through it quickly is an invitation to disaster.

The innocent-looking cloud on the horizon may resemble a cream-puff at a distance, but don't be fooled by appearances. Keep your distance. ■

PILGRIM'S PROGRESS

Key to the success of an air taxi service is the maintenance crew.

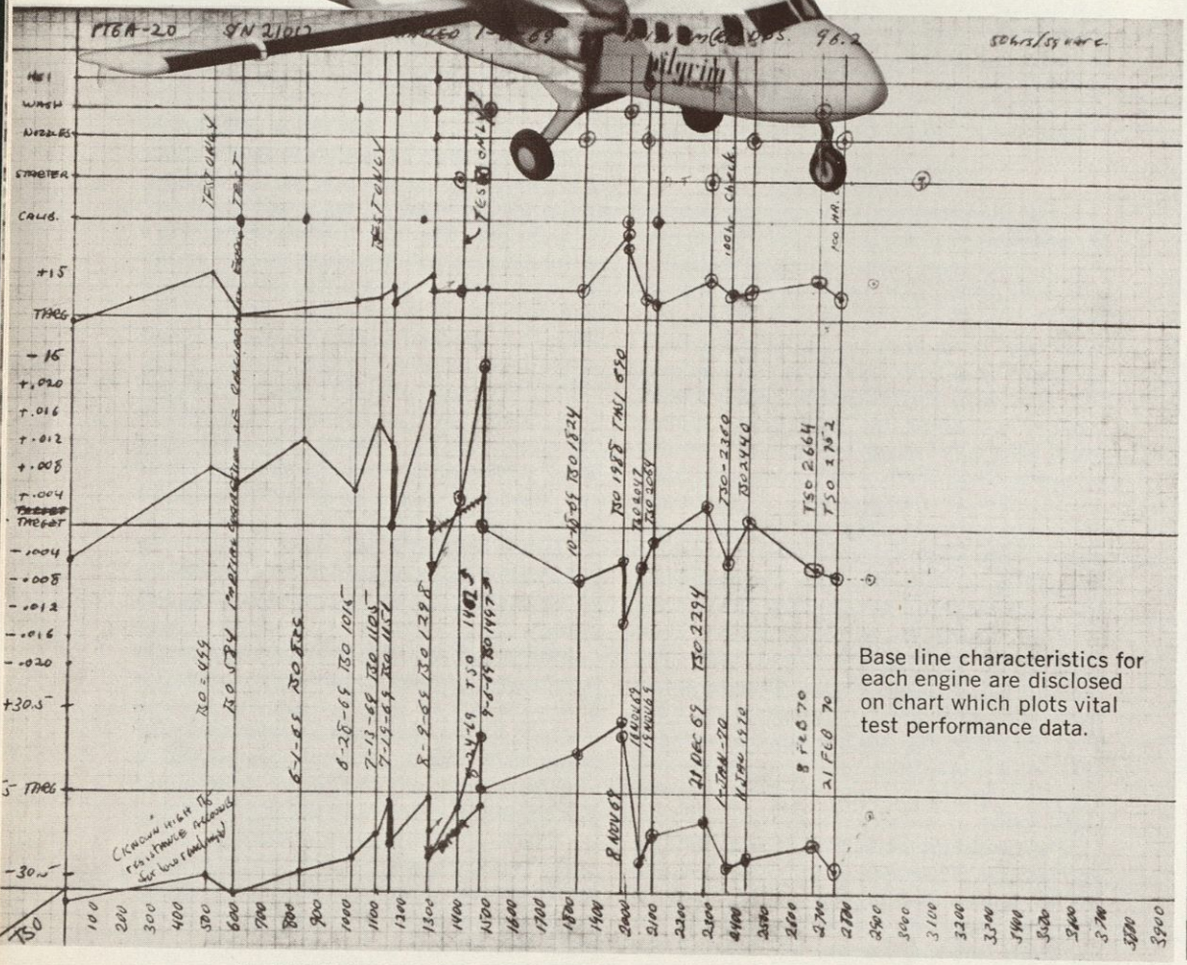
Take a man who wants a job a little more demanding than the ordinary nine-to-five routine, who likes the responsibility of working at his own pace in his own way, the excitement of playing detective in life and death matters now and then, the variety that comes from blending many trades into one, and the satisfaction of knowing he can be trusted with the safety of strangers—what kind of work does he choose?

If you are John K. Rude, Jr., of Waterford, Conn., you choose aviation maintenance. You graduate from an approved aviation mechanic's school, take a job with a newly organized air taxi service and acquire an FAA Inspection Authorization within two years. As the company grows from a two-pilot, one-plane venture to a 20-pilot, 15 maintenance men operation, you become the maintenance supervisor responsible for keeping three Twin Otters in service an average of eight hours a day.

The demands of the job fluctuate. There are good days when nothing goes wrong with the aircraft. The engines hum sweetly and steadily from start-up to shut down, and no errant service truck backs into a wingtip or control arm. And then there are rough days, when the pilots' check sheets are riddled with complaints, when a jet blast warps a trim tab, when an ordinarily well-behaved engine heat gauge wanders up and down unexplicably.

On these days you try to perform miracles. If you have a good crew, like John Rude's crew at Pilgrim Airlines (Trumbull Field, Conn.), you don't have to urge them on—they are personally involved in the challenge to do the seemingly impossible. Like you, they are on call 24 hours a day. Like you, they are never *ordered* back to the hangar for an emergency; they come as soon as they hear about it. Like you, they do it for the satisfaction, not for the overtime.

If you have the individualistic mind of a John Rude, sooner or later you are going to find your own method of doing your job. In Rude's case, he became dissatisfied with the common practice of doing routine checks on engines and making repairs or replacements only when indicated by the book or by obvious signs of a breakdown. In his view, the modern jetprop engine is too finely engineered to be treated as a mass unit of production. He reasoned that if he could find a means of treating his six en-



Base line characteristics for each engine are disclosed on chart which plots vital test performance data.

Above—maintenance superviser John Rude spends about half of his work day at his desk, where he keeps an up-to-date file on the behavior and needs of his company's three turboprop air taxis. Below—Rude and Chief Pilot John Rutledge discuss changes in section behind nose cone.

gines as individuals, with their own fine variations on the norm of engine behavior, the problem of distinguishing between a trouble symptom and a harmless fluctuation on an engine instrument could be solved—and the responsibility of a maintenance supervisor with no spare plane in the hangar simplified greatly.

Rude struggled with the problem until he succeeded in developing a "bed patient chart" for each individual engine. A single graph sheet charted the readings from three basic instruments—internal engine temperature, rpms of the gas compressor stage, and fuel flow required for a given rpm setting and torque pressure—for a progression of 100 hour checks.

The chart soon revealed engine idiosyncrasies, as opposed to warning signals. Some engines showed a tendency to register in the upper heat range from the day they arrived from the factory, while others were inclined to cling to the lower range. Once these base line behaviors were established for an engine, it was no longer necessary to wait for a reading to exceed hot or cold maximums before taking remedial action.

Rude also found, after a year of using his charts, that engine performance was affected by the season of the year. When smog and haze were prevalent over the airports used by his air taxi service, for example, he could be pretty sure that certain elevated readings on the chart were due to deposits building up on the compressor blades—a surmise that could be quickly confirmed by inspection.

Reducing TBO

The charts also allowed Rude and his crew to observe the effect of various kinds of maintenance work (cleaning of fuel nozzles, engine instrument calibration, hot section inspection, etc.) on engine performance readings. This enabled him to do away with some unnecessary maintenance, as well as predict the effect of routine engine shop work.

As a result, TBO (time between overhauls) has risen from about 2,800 to 4,000 hours on the PT6 engines. An exact estimate of the expenses saved Pilgrim Air Lines cannot be made, but the fact that Pilgrim has been able to keep all three aircraft in service without a spare plane to fall back on for the past six months is mute testimony to the value of Rude's engine charts.

Moreover, Pilgrim's aircrews, learning of their maintenance supervisor's familiarity with each of the engines in their small fleet, have formed the habit of reporting to him slight variations in instrument gauge readings which otherwise might have been ignored. They know that a 10° rise in temperature on a particular engine at a particular time could be much more significant to Rude than a 100° elevation on another engine on the same aircraft. They have also learned that, as a consequence of alert reporting, incipient trouble which could eventually cost thousands of dollars to repair can often be headed off with a half hours maintenance work.

Maintenance ingenuity has played a vital role in the current success of Pilgrim's operations, especially so because Pilgrim was the first flying service in the United States to use deHavilland Twin Otters at a time when comparatively little was known about their maintenance. Both the maintenance and aircrews at Pilgrim have contributed to modifications of the airplane adopted by the company, including: (1) stiffening stairway steps to prevent accidents on boarding, (2) eliminating water-traps in the de-icing system which were causing corrosion, and (3), relocation of oil breather tubes to prevent fouling of tail surfaces.

Maintaining aircraft is more interesting and challenging than flying them for Rude, who selected his career for the demands it made upon him, rather than for the remuneration. Raised in the farm country of upstate New York (his father was a forester), Rude learned the value of skilled hands early in life. He later moved to Connecticut and attended Putnam Trade School, where he gravitated toward aviation mechanics because he was fascinated by the broad variety of associated trades—metal work, electronics, engines, instruments, etc. It seemed to him that a man would not easily become bored with work that touched on so many skills.

An Independent Trade

Another thing Rude likes about his profession is the unseen trust given the maintenance crews on whose work the safe mechanical performance of the aircraft depends. A good mechanic, he says, never stops caring about the last aircraft he worked on until it has made about a dozen safe flights. It is not that he doubts his work, but that he takes his responsibilities personally. All good mechanics, Rude feels (and he believes his crews deserve top rating), have a built-in sense of security which enables them to work independently and to relate their work to the needs of the job rather than to the clock or the eye of supervisors.

Nevertheless, all work is checked by an alternate mechanic before an aircraft goes back into service, and Rude himself spends about two and a half days a week working alongside his crews, particularly with recently employed men he wants to observe in action. It does not take him long to find out on the job whether a new employee is suited to his "family." The small size of Pilgrim's operation leaves no room for mechanics who don't care about the smallest details that contribute to the safe and successful operation of the airline.

Consequently, the award presented to Rude in Washington, D.C. on June 30 as the top general aviation mechanic in FAA's seventh annual National Aviation Mechanics Safety Awards Program, brought a sense of pride to the entire 15-man ground crew at Pilgrim. Rude and his wife were the guests of Champion Spark Plug Company during their stay in Washington, and received over $1,000 in cash prizes from industry, including $300 from both NBAA and AOPA, $200 from National Aviation Trades Association, a $50 U.S. savings bond from the Professional Aviation Mechanics Association, and a three-day holiday trip to any destination of choice within 1,500 miles given by Cessna Aircraft.

Of no monetary value but a source of great satisfaction to the men in the Pilgrim hangar is the bronze plaque given Rude by FAA Administrator John H. Shaffer. A little of its sheen rubs off on all of them.

Lewis Gelfan

CALL FOR 1970 SAFETY AWARD ENTRIES

FAA offices throughout the nation are now accepting entries for the 1970 Aviation Mechanic Safety Awards Program; the closing date is December 31. Entrants must be active aviation mechanics, civilian or military; an FAA mechanic certificate is not required. Entry forms, available at all FAA field offices, may be submitted by eligible mechanics or their supervisors. Awards in general aviation are made in each of the fifty states; additional awards are available for Puerto Rico and the Virgin Islands. Sixteen regional awards are made for both general aviation and air carrier mechanics, and there is one national winner for each of these two categories.

Winning entries must (1) improve safety aspects of aircraft or engine performance, (2) suggest a safer maintenance or inspection procedure, or (3) refer to a consistent demonstration of excellence that led to safer or more reliable aircraft performance.

Famous
FLYERS

Lawson C-2, America's first passenger airliner, made triumphal flight from Milwaukee to New York in 1919. Stops enroute brought rave notices in Nation's press with predictions of even greater wonders to come. C-2 crashed soon after during flight tests.

Ham & Eggs Lawson

Lawson "Sleeper" found an early rest

Most historians think of the era of commercial air carriers as beginning in the 30s, with the aircraft emerging from the drawing boards of Curtiss, Martin, Douglas, Boeing and others. But for the pressure of stockholders and hastiness of a test flight, the modern air travel age might have begun more than ten years earlier, in Milwaukee, Wisc., of all places.

The would-be architect of the air age was Alfred William Lawson, all but forgotten now, but once proclaimed by Wisconsin newspapers as the Jules Verne of the 20th Century.

Born in London, England, on March 24, 1869, he emigrated with his family to Canada soon afterwards and settled in Detroit. Young Lawson soon found fault with the school system and quit in the sixth grade, having mastered as much reading, writing and arithmetic as he thought relevant, and set out on his own, earning a living selling papers and shining shoes.

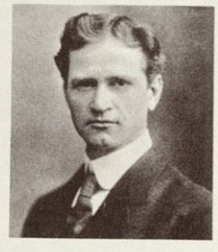
When he was 19 he signed on as a pitcher with the Goshen, Indiana, baseball team, claiming later in his autobiography that it was he who shaped the career of the famed Christy Mathewson. He also claimed to have invented night baseball, at Reading, Pa., in 1907, using a portable lighting system of his own design.

What strange metamorphosis led Lawson to aviation is not known but in 1908 he emerged as the publisher of *Fly*, the nation's first popular flying magazine. To accommodate the various kinds of flying machines of the times—balloons, dirigibles, and heavier-than-air craft—he minted the word "aircraft," which embraced all three.

Lawson learned to fly in 1910, and launched a new magazine, *Aircraft*, which he edited for five years. Contemporaries marked him as a ham-handed pilot, a fact he apparently recognized because he took additional flight training in 1913, checking out in the high performance *Sloan-Deperdussin* and *Moisant-Bleriot* monoplanes.

With his newly-polished skill, Lawson began flying his own plane from his home in New Jersey to his office in New York City, becoming the first aerial commuter.

In 1917, when America entered the war, Lawson emerged as an aircraft builder in Green Bay, Wisc. Lawson himself was not a designer, although early in his aircraft building days he liked to imply that his was the guiding genius behind his planes. His capital asset was his magnetic ability to attract skilled men and let them turn his dreams into hardware. "I sketch out on the blackboard what I want and the men do the rest" he later admitted when his star was riding high.



Alfred W. Lawson, aviation visionary and plane builder. His grand imagination anticipated the airline network which criss-crosses the U.S. today.

At Green Bay, Lawson's company built the M. T. 1 (Military Trainer) in 1917, and one year later, the M. T. 2, both advanced biplanes, but the Army expressed no interest. Almost as an aside, Lawson designed an aircraft carrier and a system for spacing a series of them within easy flying distance of each other to provide a stepping-stone route to Europe so that military aircraft could be ferried directly to the battle zone. The system provided for on-board landing of wheeled planes, and alongside service for seaplanes. The idea was not adopted, but a picket line of warships later lined the sea lanes when the NC-4 made its successful flight to Portugal in 1919.

It was with this background that Lawson descended on Milwaukee in 1919. He gathered around him a brilliant team, men who would later make significant contributions to aircraft development in their own names: Vincent Burnelli, Andrew Surini, Carl Shorey, Russell Shaw, John Carisi, Lee Wallace, and Frank Schober.

Within four months they produced an aerial leviathan—the first multi-engine passenger aircraft ever produced in the United States. Designated the C-2, its wing span was 91 feet, and its length was 48 feet. Two 400 hp Liberty 12-cylinder engines mounted between the wings pushed it along at 110 mph. It had 18 passenger seats, with eight additional folding seats and a range of more than 400 miles.

With Lawson as "Captain in Command," the C-2 made a triumphal flight in September 1919 to New York and back, with stops at Chicago, Syracuse, and other points en route. The "Captain in Command" concept was uniquely Lawsonian. As he saw it, the pilot was a lesser person, a steersman, Lawson called him, who merely flew the plane and set engine speeds and took care of the details of flying, in cooperation with the engineer. The "Captain in Command" had loftier duties which Lawson never made clear.

The C-2 crashed and was destroyed in tests, but Lawson was soon at work on the L-4. It dwarfed the C-2: its biplane wings, of equal length, spanned 117 feet, the fuselage was 62 feet long, and three standard Liberty 400 hp engines gave it a cruising speed of 112 mph and a range of 825 miles. Loaded, it weighed 22,820 lbs.

With a three-man crew—"Captain in Command", pilot, and engineer—it could carry 22 day passengers, or six night passengers who bedded down in bunks which folded out from hidden recesses in the cabin. In addition to a restroom, first ever installed in an airplane, it also had a linoleum-tiled hot and cold shower "for a fastidious passenger." If there were two such aboard, the second was likely to be out of luck as the water tank only contained 20 gallons. The cabin was carpeted, the walls and ceiling finished in mahogany with cream trim.

Within minutes, the seats could be removed and cargo or mail space provided. The latter feature enabled Lawson to obtain the first airmail contract, on September 13, 1919, for $175,000 a year to carry mail between St. Louis and Pittsburgh by way of Columbus, Ohio, and Indianapolis, Indiana.

The L-4 had a number of technical novelties, most of which came from the fertile mind of chief designer Lee Wallace.

The right seat—the "steersman's" (pilot's) seat, could be ratchetted up and down, allowing the pilot to fly with the wind in his face, or deep within the enclosed cabin. Speaking tubes connected him and the "Captain in Command" with the engineer who occupied one of the passenger seats in the main cabin. Engine controls were mounted on a central pedestal between pilots, and some switches were mounted overhead, just as in a modern airliner.

As the L-4 began to take shape, stockholders, still smarting from the pain of seeing the C-2 wiped out, prodded Lawson to get the huge plane into the air and into revenue producing service. By mid-1920, the plane was ready for taxi tests, but so great was the clamor for immediate return on shareholders' investments that Lawson gambled on a test flight soon after the giant plane was rolled out of the hangar.

The gamble failed—the plane crashed on takeoff, striking a row of trees bordering the end of the 300-foot runway. With it crashed the Lawson Airline Transportation Co., and a grand dream of aerial conquest. Lawson faded from the scene.

In the '30s he joined dozens of others in concocting easy money schemes; his was called "Direct Credits for Everybody," and it sought to abolish the gold standard, interest, "alien" financiers, and give everybody state credit secured by hope. In the language of the day, the plan was called a "Ham and Eggs" scheme, but Lawson attracted legions to it, each for a modest fee.

He later founded "Lawsonomy", which he described as the "knowledge of life and everything that pertains thereto," in Detroit, where its headquarters remain today.

Alfred William Lawson died on November 29, 1954, in San Antonio. He was 85 and left no survivors—except the fading memory of two giant aircraft, born a decade ahead of their time.

Frank J. Clifford

Lawson L-4 "Night Sleeper" had pull-out bunks for six passengers or seats for 22. It crashed on its initial test flight.

■ GENERAL AVIATION GROWTH WILL CONTINUE. General aviation aircraft, which numbered 124,237 in 1969, will swell to an estimated 235,000 within the next 10 years. The prediction is made in the latest edition of FAA's "Aviation Forecasts, Fiscal Years 1970-1981, available free from FAA, TAD-484.3, 800 Independence Ave., S. W., Washington, D. C. 20590.

Other significant trends noted in the decade ahead: turbine-powered general aviation aircraft will total 9,100, compared with 1,833 in 1969; GA flying hours will increase some 80 per cent, swelling to 45.6 million hours from a 1969 total of 24.8 million; commercial general aviation flight,especially by air taxis will show the biggest increase, going to 10.4 million from 4.8 million; general aviation use of IFR will quadruple from a 1969 total of 3.2 million to 16.9 million operations by July 1, 1981.

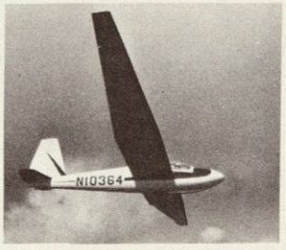
■ GOLDEN ANNIVERSARY FOR FSSs. August 20th will mark the 50th anniversary of the Flight Service Station system. The first four stations were established in 1920 by the Post Office Department as "Air Mail Radio Stations" to support the transcontinental air mail service. The System now includes 330 FSSs and 10 International FSSs.

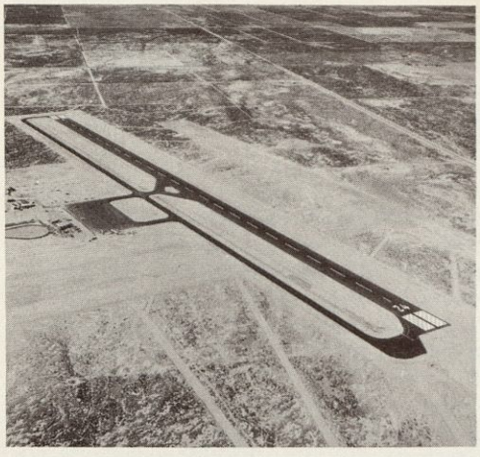
The August issue of FAA AVIATION NEWS will commemorate the birth date of the Flight Service Station with articles on the historic and current function of this oldest FAA field facility. A separate historic leaflet will also be available in limited quantities.

■ RADIOACTIVE AIRCRAFT INSTRUMENT DIALS can be a hazard to health. Many older flight instruments have radium-activated luminous markings. The self-luminous material, generally found on dial faces and pointers adjacent to switches, tends to flake with age. When the instrument is damaged or dismantled, particles of the radium paint can be swallowed, inhaled, or absorbed through a break in the skin. Even where dials no longer emit light, radium may still be present.

The Federal Air Surgeon recommends that all radium-painted surfaces of flight instruments undergoing repair be replaced with non-radioactive material. Where it is not practical to replace the items, the surfaces may be coated with ten coats of spray lacquer. As an interim measure the markings may be covered with transparent tape.

■ ON WINGS OF THE WIND. Some 30 foreign countries, from Argentina to New Zealand, sent sailplane teams to Texas when the U. S hosted the XII World Gliding Championships at Marfa, Texas, June 21 through July 4. Sixty-one foreign sailplanes, including one from the tiny British island of Guernsey, competed with their American counterparts. The event sanctioned by the Federation Aeronautique International, was a joint effort of the Soaring Society of America and the city of Marfa.





Lancaster Airport (left) and Palm Springs are two of four California airports now equipped to provide Area Navigation (RNAV) service. Others are at Fullerton, Torrance. RNAV reduces terminal area congestion, increases airspace utility and speeds up landings.

RNAV Approach Procedures Set Up at Six Airports

The first series of area navigation (RNAV) instrument approach procedures have been established by FAA at six selected general aviation airports: Longview, Tex., Kirksville, Mo., Fullerton, Palm Springs, Lancaster and Torrance, Calif.

Activated on June 25, the new procedures will enable pilots with approved RNAV equipment to conduct straight-in approaches to runways at the six airports without the use of runway-oriented electronic approach aids, such as VORs, Locator Beacons, etc. The time-consuming procedure turns and circling maneuvers required for a conventional instrument landing are not required for the area navigation pilot, who can make his landing in about the same amount of time as required for a VFR approach and landing.

Area navigation is based on airborne computer continuous updating of aircraft position, derived from VOR/DME inputs. Sixteen transcontinental RNAV routes were established by FAA in September of 1969 on an interim basis, relieving congestion on heavily traveled airways. Long range FAA goals call for nationwide and terminal area navigation procedures entirely unconstrained by the need to fly directly from one ground-based checkpoint to another.

At two of the California airports, Palm Springs and Lancaster, RNAV instrument approach procedures will permit approaches under lower than existing landing minimums for non-RNAV approaches.

FAA issued its first Supplemental Type Certificate for the installation and operation of RNAV equipment in general aviation aircraft last month. The Butler Vector Analog Computer (VAC) was approved for use in a Butler-owned Beech Queen Air.

Atlanta Named as 1st Terminal Control Area Airport

Effective June 25 all traffic in and out of Atlanta Municipal Airport will be under ground control under a new rule established by FAA to enhance operational safety at major air traffic hubs.

Atlanta is the first of 22 such locations to come under the new terminal area rules. The terminal control area will be tailored to accomodate local traffic needs. At the busiest airports, designated Category I, all planes landing will be required to be transponder equipped, and no student pilots will be allowed.

Other proposed Category I airports are: Boston; Dallas; Kennedy; LaGuardia; Los Angeles; O'Hare; Washington National; and San Francisco. Dates for the switchover for each of the airports will be announced.

At Category II airports some VFR operations will be authorized by aircraft not transponder equipped, and flights by student pilots.

Under consideration for Category II status: Newark; Detroit; Denver; Philadelphia; Pittsburgh; St. Louis; Cleveland; Minneapolis; Houston; Kansas City; Seattle; New Orleans; Cincinnati; and Las Vegas.

NUMERO TWO MILLION—Forty-three years after William P. MacCracken, Jr., was awarded Airman Certificate Nr. 1 on April 6, 1927. Airman Certificate Nr. 2,000,000 was recently presented to Lt. (jg) Robert E. Dawson of Fighter Squadron 121 at Miramar Naval Air Station, Calif. Both certificates were for the same rating—"Private Pilot".

Safe Handling of Aircraft Weather Radar Explained in New Circular

The dangerous potential of airborne radar operated on the ground is explained in FAA Advisory Circular AC 20-68, "Recommended Radiation Safety Precautions for Airborne Weather Radar," available free from FAA, (TAD 484.3), 800 Independence Ave., S.W., Wash., D.C. 20590.

The circular warns against operating airborne weather radar inside a hangar unless the radar transmitter is deactivated or the energy is directed toward an electronic absorption shield which sops up or scatters the RF (radio frequency) energy. The same effect can be gained by pointing the antenna to direct the energy through an open hangar door.

Personnel may be injured by standing nearby in front of a radar antenna which is transmitting, but not rotating unless the antenna is tilted upward to clear ground personnel and nearby obstructions.

The new circular contains an appendix which provides an accurate method of determining safe distance for personnel from operating, rotating antennas. The calculation involves the type of radar, average power output, pulse repetition, pulse width, wavelength, and antenna gain.

The circular points out that X-rays may be emitted when high-power radar transmitters are operated out of their protective cases. Stray X-rays may emanate from the glass envelope type pulser, oscillator, clipper or rectifier tubes, as well as magnetrons.

Operators of airborne radars are advised to obtain complete technical data concerning their radar equipment from the manufacturer.

An estimated 8,000 general aviation aircraft are equipped with airborne radar.

FLYER FLICKER FARE—More than 60 films, covering many aspects of flight safety, airport usage, air traffic control and other subjects of interest to the aviation community are described in the 1970 FAA Film Catalog.

Free copies of the catalog, with complete instructions for borrowing FAA films without charge, are available from the DOT/FAA Distribution Unit, TAD 484.3, 800 Independence Ave. S. W., Washington, D. C. 20590.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Asking for Trouble

In a recent *Forum* column you repeated an admonition quoting certain propeller manufacturers as to the adverse effects of moving light aircraft by pushing or pulling on the propeller blades.

How can the forces applied by one or even two strong men equal or even approach the thrust forces exerted both in pushing and pulling (as power retardation on a fair rate of descent) by a 150 to 170 hp engine, or the forces resulting from changing pitch, or the extreme centrifugal forces, etc.?

A. E. Graham
Flushing, N. Y.

If a large external force is applied in the area of the blade tip, the combination of this force and the blade length (moment) could exert considerable stress on the blade shank and blade retention assembly. Also, there is the possibility that blade anti-friction bearings could be brinelled or seals deformed.

Perhaps of greater importance is the possibility of injury to the person who pushes or pulls on the propeller. Movement of the propeller could cause the engine to fire accidentally if there was a defect in the ignition wiring.

With all the other places on an aircraft for pushing or pulling, why pick on the propeller?

• Propeller First

I would like to thank all the military and civilian agencies involved in the co-sponsored physiological training program of May 2, especially the 831st Training Unit at George Air Force Base (Calif.).

I was able to take a "flight" in the high altitude chamber and experience hypoxia under controlled conditions. As a private pilot, had I ever actually had hypoxia in my aircraft without knowing my symptoms, I would probably have returned to earth propeller first.

I hope to see FAA AVIATION NEWS carry more stories on these programs, since you are Number One to most of general aviation.

Robert Leroy Chapman
Gardena, Calif.

• Probable Cause of Accidents

It is my assumption that FAA or a related agency investigates and determines the cause of general aviation crashes and mishaps. Are there periodic reports published examining the cause and contributing factors in accidents? It would seem that such publications would be good education for pilots.

R. C. Gabrielson
Hoven, S. D.

FAA, in cooperation with the National Transportation Safety Board, investigates all aircraft accidents. The report of the accident, giving all pertinent details and assigning probable cause and contributing causes, is the responsibility of the NTSB. There is a varying fee scale charged for different types of reports. For details write to National Transportation Safety Board, Accident Inquiry and Record Section (NE-513) 1626 K Street, N.W., Washington, D.C. 20591.

• Aviation Communication Careers

I would like to know if there is any type of "summer intern" program in air traffic control for those interested in such a career. I am a junior at Michigan State University majoring in communication arts; also, a student pilot about to take the private flight test after passing the airman written. I am seeking a career where it would be possible to combine aviation and communication.

Alfred R. Heikkinen
East Lansing, Mich.

FAA does not have a "summer intern" program such as you describe in your letter, but does participate in "work-study' programs with various two-year colleges. The brochure "Aviation Education" contains a listing of these colleges and lists the admission officials to contact. Free copies of this publication are available from the Aviation Education Staff, GA-20. FAA/DOT, 800 Independence Ave., S. W,. Washington, D.C. 20590.

A useful pamphlet entitled "Working For The U.S.A.' describes Federal hiring practices in detail and should answer most of your questions on this subject.

• Helpful Hilder

Thanks very much for your splendid story of the Floyd Smiths (FAA Aviation News, May 1970). You helped to make my Mother's Day a sunshiny one.

May I make one correction? The photo of the Martin-Curtiss pusher depicted was not our Smith tractor biplane but was the Martin Flying School's only plane which Floyd used to instruct Martin's students in 1914. It didn't even have dual controls.

On our first cross-country flight Floyd installed a dual three-in-one control in July 1912. In 1913 Martin changed to a three-in-one control on his first "T" (Trainer), rather than the Curtiss yoke control which he used on his pushers.

Hilder Smith
La Mesa, Calif.

• Book Learning First, Fly Later

As a student pilot who has just passed my written test and about to take my flight test, I believe ground school should be compulsory, and a written test passed before actual flight training is given. Without the valuable information learned in ground school, student pilots can get into a lot of trouble because of ignorance about air traffic control and procedures, weather, etc.

Harold J. Maloney
Sedona, Ariz.

Formal ground school and written examination is not required before actual flight training can begin, but student pilots are required to have an understanding of weather, air traffic procedures, etc., before they solo or fly solo cross-country. Section 61.63 and 61.65 of FAR 61 require endorsement by a flight instructor that the student has complied with these FAA requirements before he is permitted to solo or fly outside the local area.

• Marine Pilot Reunion

Former members of Marine Fighter Squadron (VMF) 312 are planning to hold their 25th reunion in Chicago in October 1970, and would like assistance in contacting all personnel serving in VMF 312 from its commissioning in August 1943 through June 15, 1945.

Would anyone with current addresses for these personel please contact me.

Merritt O. Chance
Box 54, RFD #1
Brookeville, Md. 20729

• Runway Weight Limits

I would like to know who established the "Runway Weight Bearing Capacity" limits for single, twin, and twin-tandem types of landing gear as published in the *Airman's Information Manual* (AIM) and what does it mean?

If no maximum limit is published would the weight listed for twin-tandem of say 170,000 pounds be the maximum allowable gross weight of an aircraft using that runway?

Jack Koeneman
Virginia Beach, Va.

The "Runway Weight Bearing Capacity" is usually based on a detailed pavement data survey made by an FAA Airport Engineer. The values published for the types of landing gear you are asking about are coordinated with the airport owner before being published in AIM or the Airport Data System.

The values mean that under normal circumstances, the pavement will support operations by aircraft of that gross weight, and such operations could continue day after day without distressing the pavement. The airport owner retains the option to limit aircraft operations to a specified maximum weight to protect the pavement—designated as "MAX" in the AIM, followed by the number determined by the airport owner as an appropriate gross weight limitation.

In addition, a listing of twin-tandem 170,000 pounds does mean that that is the maximum allowable gross weight of an aircraft with twin-tandem gear which may use that runway.

U.S. GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D.C. 20402

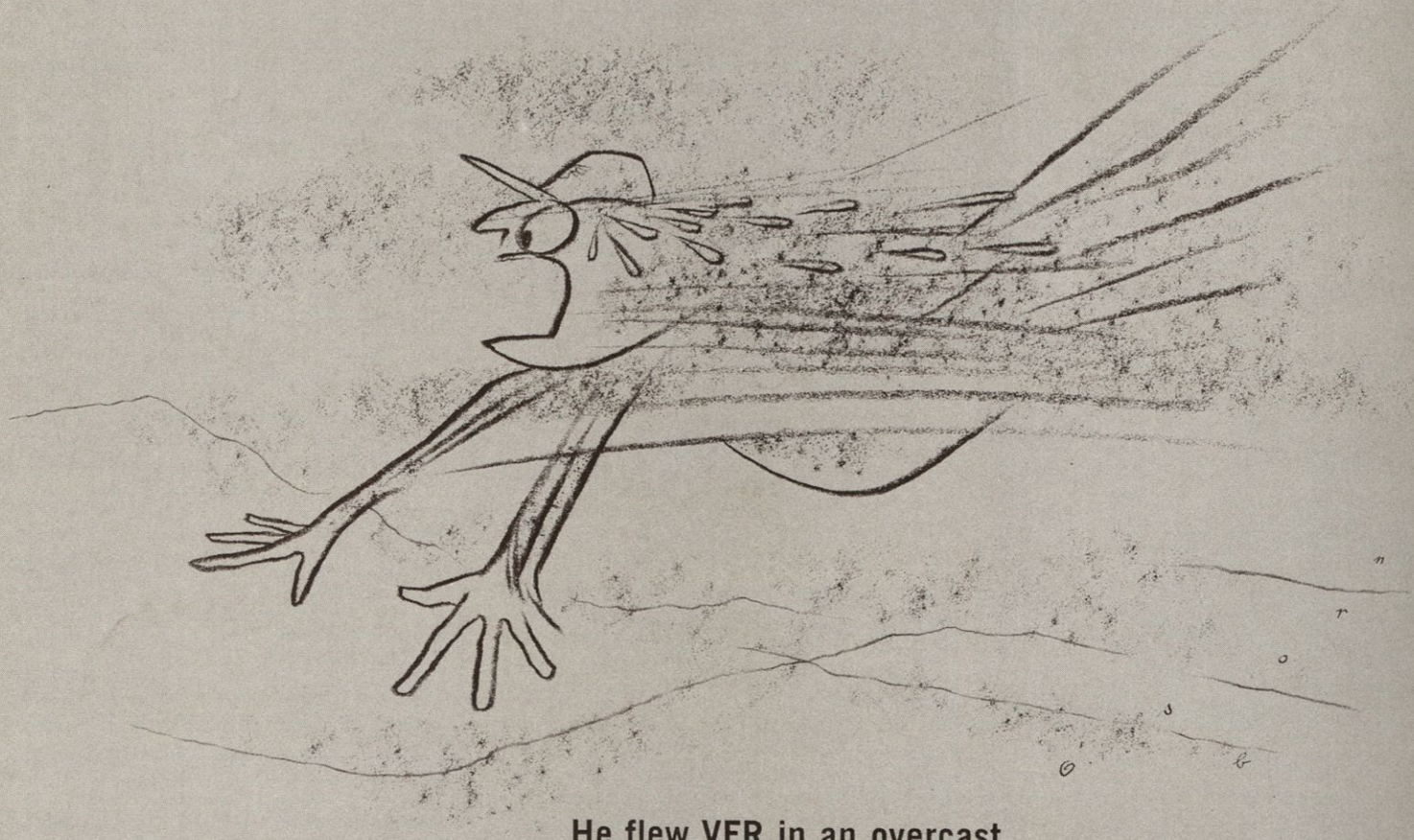
OFFICIAL BUSINESS

RETURN AFTER 5 DAYS

POSTAGE AND FEES PAID
U.S. GOVERNMENT PRINTING OFFICE

AVN NOV
ARTHUR A CARTER JR
2145 N PIERCE ST, APT 7
ARLINGTON VA 22209

This erstwhile pilot had a blast



He flew VFR in an overcast

Suggested by Louis J. Rauch
International IFSS Anchorage, Alaska